



Resources

Management

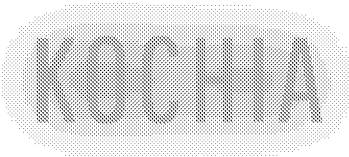


Weeds

Diseases

Insects

Take Action Kit





Kochia Distribution and Biology

- Kochia is well adapted to the Great Plains and western regions of the U.S. and Canada because it is tolerant of hot, dry conditions and soils with high salinity.
- Kochia, which can produce up to 30,000 seeds per plant, can emerge as early as February in Kansas and March in the Northern Plains, but germination can extend through August throughout the Great Plains states.
- Kochia is competitive with crops and problematic in fallow periods between crops. Early-emerging kochia can reduce crop yields by 70 percent or more and can also interfere with harvest.
- Kochia has an alternating arrangement of linear leaves that are covered with dense hairs. It can grow to a height of 6 feet and has a spherical

shape, especially when growing with limited competition. Kochia roots can extend down 15 feet and measure 21 feet in diameter.

- Kochia is especially hard to control because seeds initiate germination within 2 to 3 hours under favorable conditions, and seedlings establish quickly.

Herbicide Resistance in Kochia

Evolution of herbicide-resistant kochia is rapid due to high genetic diversity, short seed life and heavy reliance on herbicides for control in minimum- and no-till cropping systems. Kochia has developed resistance to four different herbicide sites of action.

Many kochia populations are resistant to multiple sites of action. One population in Kansas was resistant to all four herbicide sites of action (listed below).

Chemical control of even non-herbicide-resistant kochia can be difficult due to application and spray coverage issues, inadequate herbicide rates, adjuvant selection, plant size and environmental stress at time of application.

Management of Kochia in Soybeans

1. **Rotate crops.** Crop rotation is important to help diversity kochia-control strategies and herbicide programs over time.
 - More effective kochia herbicides are available in grass crops than in broadleaf crops, especially for postemergence control. A competitive winter wheat crop can greatly suppress kochia emergence and growth.
2. **Start clean.** It is imperative to control kochia in early spring because of its emergence patterns, dense populations and difficult-to-control large plants.
 - Kochia should be controlled at or before planting.

- Very few effective postemergence herbicides are available for kochia control in broadleaf crops.

3. **Apply an effective soil-applied, pre-emergence herbicide.** Kochia can be controlled by a number of residual herbicides if activated before germination.

- Residual herbicides should be applied in late fall or very early spring to be activated before kochia starts to germinate.
- Early season control with pre-emergence residual herbicides greatly reduces the reliance on postemergence herbicides for control.

4. **Target small weeds after they emerge.** Timing of the herbicide application is critical for postemergence control of kochia.

- To optimize herbicide performance, apply postemergence herbicides with the recommended adjuvants, tank-mix partners, spray volumes and application guidelines before kochia grows taller than 3-4 inches.

5. **Prevent seed production.** Kochia is day-length sensitive and begins flowering in late July and August. Due to its short seed life, killing kochia before it flowers and produces seed is an effective way to manage it. Strategic tillage and cover crops might be helpful in minimizing kochia seed production.

- Fall cover crops can suppress kochia establishment and out-compete young seedlings in the spring.
- Tillage controls kochia by disrupting the roots and dehydrating plants, but it also depletes soil moisture and leaves soil more vulnerable to wind and water erosion.

RESOURCES

[Kochia Management Fact Sheet](#)

[Weed Out Resistance Poster](#)

[Herbicide Classification Guide](#)

[Take Action Herbicide Classification
Chart](#)

KOCHIA HAS SHOWN RESISTANCE TO:

2

ALS INHIBITORS*Amino Acid Synthesis Inhibitors*

6

PHOTOSYSTEM II INHIBITORS (DIFFERENT BINDING THAN 5 & 7)*Photosynthesis Inhibitors*

9

EPSP SYNTHASE INHIBITOR*Seedling Shoot Growth Inhibitors*

4

SYNTHETIC AUXINS (TIRI AUXIN RECEPTORS)*Growth Regulators*

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